4. German Case Study

4.1 Background Information

Country: Germany

Operators:

T-Mobil www.t-mobil.de Mr. Berger Marketing Department Phone: +49 228 936 4950	**Viag Interkom** www.viaginterkom.de Johannes Heinritzi Analyst Relations Phone: +49 895 473 8219 Hohannes.heinritzi@viaginterkom.de

Regulator:

Regulatory Authority for Telecommunications and Post http://www.regtp.de Mr. Hanson Ruling Chamber # 3 Heinrich-Von-Stephan F Str. Postfach 8001 D-53 105 Bonn

GSM MOU Association:

GSM MOU Association www.gsm.org Pinar Cerman Tel: +353 1 2695922 Fax: +353 1 2695958 pcerman@gsm.org

4.2 European CPP Environment

Calling-Party-Pays (CPP) was introduced in Europe when the first analog cellular networks were launched in the early 1980s. An overwhelming majority of operators in Europe started using

Calling Party Pays when launching service, although a small number of operators in Eastern Europe have chosen the Mobile-Party-Pays billing system.

In the CPP environment, the cost of a call placed to a cellular user is charged to the person that places the call. Cellular users pay only for outgoing calls. The exception to this case is international roaming, where cellular users are required to pay for incoming calls (roaming charge) while using a cellular network outside of their home country. This case is discussed in greater detail below.

Retail prices for calls to cellular users in the CPP environment are determined by the operator (fixed or mobile) in whose network the call originates. The operator (fixed or cellular) where the call originated bills its subscribers to recover the termination charges, the cost of conveying the calls to the cellular network, retail costs (marketing, billing, bad debt provision etc.) and a profit margin. The cellular operator that terminates a Calling Party Pays calls receives a payment (the termination charge) to compensate the operator for completing the call.

The Calling Party Pays price greatly depends on the interconnect charges that fixed and cellular operators agreed upon. Although there is no direct relationship between retail fixed-to-cellular prices and wholesale network charges, interconnection charges have been the underlying issue in the fixed-to-cellular price-making mechanism.

4.3 Interconnection Agreements

Interconnection refers to the physical and logical linking of telecommunications networks in order to allow the users of one network to communicate with users of other networks. To provide connection with fixed and cellular networks, cellular operators are required to enter into interconnect agreements. These interconnection agreements determine wholesale network termination charges, on the basis of which retail prices are established.

4.3.1 EU Regulation

The Interconnection Directive from the European Commission (EC), which was adopted in June 1997, requires member states to guarantee the rights of new telecom operators to obtain interconnection on equitable and non-discriminatory terms. The EC also recommends that operators with significant market power (determined by operators with a market share greater than 25%) implement a cost-accounting system based on forward-looking and long-run average incremental costs (LRAIC).

The EC is also considering the extension of the interconnection regime beyond the dominant national fixed operators, to those fixed and cellular operators that are defined to have significant market power by the national telecommunications regulator.

In February 1998, the EC has launched an investigation into interconnection tariffs that apply between fixed and cellular operators. The objectives of the investigation were to verify that:

- public switched telecommunications network (PSTN) operators apply the same conditions to cellular operators as to other fixed operators for calls that terminate within their network;
- cellular operators apply the same conditions to fixed and cellular operators for calls that terminate within their cellular network.

4.3.2 Issues

Cellular operators argue that the EU regulatory framework for fixed interconnection should not apply to cellular operators as well. The routing of cellular calls follows a path that is very different to calls that terminate on a fixed network. Fixed-line incumbent operator's cellular subsidiaries do not possess a level of market power with respect to the number of calls that are completed on their network.

4.4 Roaming Procedures

International roaming procedures are fairly similar across Europe. Operators establish bilateral roaming contracts and negotiate the level of wholesale network charges that the corresponding roaming party will pay to the host network. In May 1999, the GSM MoU Association developed a new Inter Operator Tariff (IOT) procedure, which stipulates that operators set fixed roaming rates with all their roaming partners. However, this procedure allows for operator-to-operator volume discounts or other bilateral arrangements.

Roaming capabilities are built into the GSM architecture, handling location and incoming call routing functions, as well as authentication and security aspects. When a subscriber roams in a foreign country, the user is registered on the foreign network, reporting the user's location to the home network. For reliability reasons, GSM has a periodic location updating procedure. When an incoming call is made, the home network retrieves the user's location and routing information, and directs the call to the host network.

Mobile Party Pays applies to roaming charges in Europe; cellular users are required to pay for the roaming portion of incoming calls. Incoming charges arise due to the costs incurred by the cellular subscriber's operator transferring the call to the roaming host network. The largest portion of revenue earned from roaming is retained by the subscriber's home operator, however the roaming host network also adds administrative surcharges.

Roaming calls fall under the Mobile Party Pays billing system due to the fact that the calling party does not know the location of the party that is called. Therefore CPP would mean incurring unforeseeable charges on the calls to cellulars. It is not likely that roaming calls will become CPP in the future, however operators are taking steps to make roaming charges more transparent to their users.

When a roaming user makes an outgoing call, the roaming host network handles the call similar to a call from its own network. The cost of such a call is usually higher due to additional administrative and billing costs of handling a roaming phone call. In addition, the subscriber's home network also includes its own mark-up in the price. Depending on the tax regulation between countries, taxes from the home country may also be added.

A typical breakdown of the charges for a roaming subscriber in Europe would look as follows:

- Incoming calls: roaming charge set by the home network
  administrative surcharge of the host network (10-20%)
  + tax (15-20%)

- Outgoing calls: charge set by the host network (depends on the type of call)
  + home network mark-up (20-25%)
  + tax (15-20%)

As the diversity of tariff plans is increasing, the operators are also designing special roaming packages targeted at business travelers and high volume users. In many cases, these packages offer 40-70% discounts on roaming fees or guarantee flat roaming rates for a number of foreign countries. Lower airtime costs are partly compensated by higher monthly charges.

Roaming is a significant revenue stream for European cellular carriers, as they typically receive 10% to 20% of revenue from roaming calls. For some operators, that number reaches 40% depending on the season of the year and on the country operating in.

Issues

Although retail roaming charges are published, there is little data about how much of these charges actually meet costs and how much constitute operator profit. So far, regulators and the European Commission have not interfered with roaming practices, but it is believed by many industry observers that roaming charges are extremely high. In the future, pressure could be placed on operators to reduce the price and make the tariffs more transparent.

4.5 Operator Background

4.5.1 T-Mobil

T-Mobil was established in 1993 as a wholly owned subsidiary of Deutsche Telekom; operating a C-Netz and GSM network. The analog C-Netz network was launched in May 1986 and the GSM 900 network was launched in July 1992.

4.5.2 Viag Interkom

Viag Interkom, the fourth cellular operator in Germany, was granted a GSM-1800 network license in 1997.

Viag launched its "Metropolitan Service" in 8 of the 10 major German urban centers in October 1998 with 50% population coverage. In order to enhance its national coverage capabilities, Viag initially formed a 'national roaming' agreement with Swisscom of Switzerland, and, most recently, with T-Mobil in Germany.

Viag Interkom is a part of the Viag Group, a large industrial group of companies, which also includes landline and Internet businesses. Viag plans to offer convergent fixed-line and cellular solutions in the near future.

All operators in Germany have launched service using the Calling-Party-Pays billing system.

4.6 Notification or Awareness of Cost of Call

There is no formal notification to the calling party of a charge that will be levied when calling a cellular subscriber. However, there is a general awareness that calls to cellular phones cost more than a local call. Since numbering of cellular users is different from that of landline numbers, callers are able to distinguish cellular numbers from landline ones.

Pay phones or other types of telephones (such as hotel phones) are generally not blocked from executing calls to a cellular party. No notification is used.

4.7 Billing Requirements and Issues

Since Deutsche Telekom is the dominating fixed line operator in Germany, most of the fixed to cellular calls are originated and routed in DT's network. However, an increasing proportion of calls comes from DT's competition in the local loop. (CLECs are estimated to carry about 27% of all voice traffic in Germany). Below is a summary of fixed-cellular interconnect charges,

agreed between Deutsche Telekom and the German cellular operators, which was approved by the Regulatory Authority in January 1999.

Fixed to Cellular Interconnection Charges (US$)

	Peak	Off Peak
Deutsche Telekom to Mannesmann Mobilfunk (D2)		
Local	$0.02	$0.01
Regional 1	$0.03	$0.02
Regional 2	$0.03	$0.02
Regional 3	$0.04	$0.03
Deutsche Telekom to T-Mobil (D1), E-Plus (E1) and Viag Interkom (E2)		
Local	$0.02	$0.01
Regional 1	$0.02	$0.02
Regional 2	$0.03	$0.02
Regional 3	$0.03	$0.02

Note: Peak 9 AM to 9:00 PM, Off-Peak 9:01 PM to 8:59 AM and weekends

Although retail fixed-to-cellular prices do not depend on the distance of the call, wholesale interconnect rates vary between local and regional zones.

The Regulatory Authority, Germany's telecommunications regulator, does not generally interfere with interconnect methodologies, however it has conducted several inquiries into fixed-cellular and cellular-fixed interconnection rates, stipulating that Deutsche Telecom and the cellular operators reduce their interconnect prices.

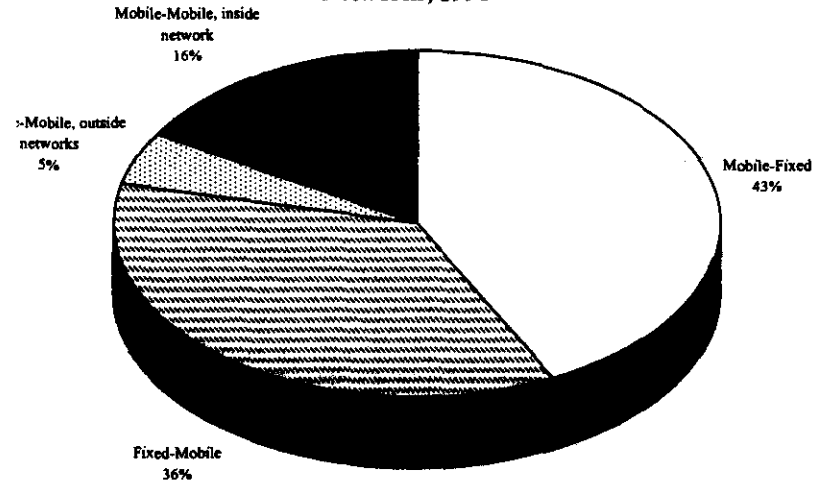
In April 1998, the Regulatory Authority opened an inquiry into cellular to fixed interconnection rates in order to determine if the rates were based on the costs of efficient service provision. In the meantime, Deutsche Telekom agreed with cellular operators on a plan to gradually reduce the cellular to fixed interconnection rates. The regulator hopes to accomplish equality in fixed to cellular interconnect charges by January 2000. On March 29, 1999, the Regulatory Authority approved the reduction of cellular-fixed interconnection rates until June, 30, 1999, and obligated Deutsche Telekom to further reduce interconnection rates to the level that are currently applied on fixed to fixed calls.

4.8 Composition of Cellular Traffic

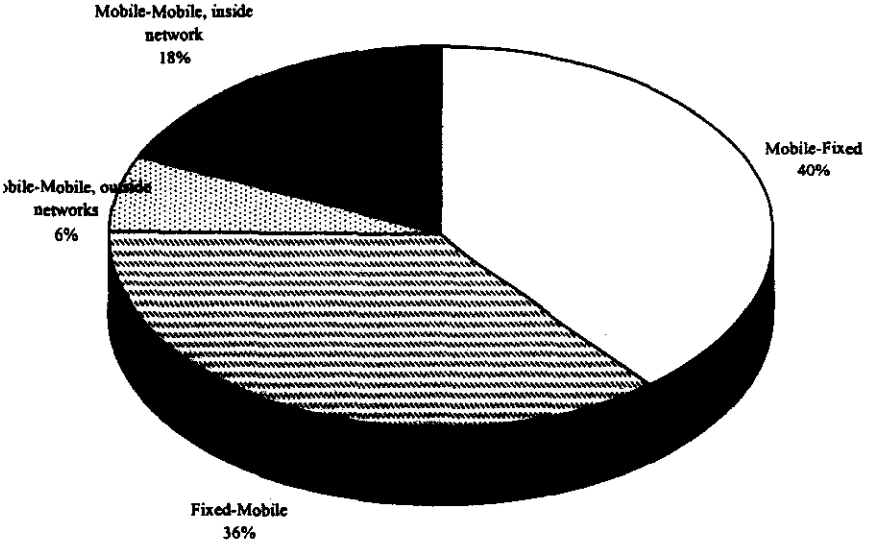
Traffic Patterns, Germany

Millions of Minutes	1998	1Q 1999
Mobile-Fixed	7,037	2,089
Fixed-Mobile	5,961	1,911
Mobile-Mobile, outside networks	850	344
Mobile-Mobile, inside network	2,714	976
Total	16,562	5,320

Distribution of Call Minutes in German Mobile Networks, 1998



Distribution of Call Minutes in German Mobile Networks, 1Q 1999



The above diagrams show the distribution of traffic in cellular networks throughout Germany. Calls from cellular subscribers to fixed lines make up the largest share of traffic, followed by incoming calls from fixed line. Comparison of the distribution of traffic minutes in 1998 and 1Q 1999 indicates that the share of cellular to fixed calls is decreasing and that cellular traffic inside and outside cellular networks is growing.

4.9 Difference Between Cost of Landline and Wireless Calls

Below is the summary of prices applied to the different types of calls.

Service Pricing, T-Mobil (US$)

	Peak	Off-Peak	Weekends
Landline (DT)-to-mobile	$0.49	$0.26	$0.26
Mobile-to-landline	$0.27 - $0.71	$0.21	$0.21
Mobile-to-mobile (within T-Mobil's network)	$0.37	$0.21	$0.21
Mobile-to-mobile (outside T-Mobile's network)	$0.71 - $1.04	$0.70 - $1.04	$0.21
Landline-to-landline (DT local)	$0.05	$0.03	$0.02
Landline-to-landline (DT long distance)	$0.20	$0.07	$0.03

Note: Peak: 9 AM-6PM, Off-Peak: 6:01 PM to 8:59 AM Monday to Friday

Service Pricing, Viag Interkom (US$)

	Peak	Off-Peak	Weekends
Landline (DT)-to-mobile	$0.49	$0.26	$0.26
Mobile-to-landline	$0.54	$0.16	$0.16
Mobile-to-mobile (within Viag's network)	$0.16	$0.16	$0.16
Mobile-to-mobile (outside Viag's network)	$0.54	$0.16	$0.16
Landline-to-landline (DT local)	$0.05	$0.03	$0.02
Landline-to-landline (DT long distance)	$0.20	$0.07	$0.03

Note: Peak: 9 AM-6PM, Off-Peak: 6:01 PM to 8:59 AM Monday to Friday

Landline to cellular prices are significantly higher than local landline rates, but are comparable with long-distance rates. Fixed-mobile rates are determined by the incumbent operator Deutsche

Telekom while cellular-fixed rates are determined by the mobile operators. As cellular is a more competitive industry than fixed line service, cellular prices have declined over the past few years. In addition, lower off-peak cellular prices are also a way for cellular operators to attract more personal users.

Another issue that results in Germany's high Calling Party Pays is the cost of routing calls from fixed network to cellular networks. In Germany, interconnect rates depend on the distance that the call travels. For example, long-distance call to mobile in Germany may travel the long-distance path through the landline, while in other countries, such as the UK, it is transferred to the nearest point of interconnect and then routed through the mobile network. This decreases costs and thus a lower interconnection rate can be agreed upon.

T-Mobil's prices for calls to other cellular networks are higher than both the landline prices and Viag's prices to other cellular subscribers. As a new entrant, Viag is forced to offer competitive rates for calls to other networks. In addition, lower rates are supposed to compensate for the operator's limited coverage.

4.9.1 Revenue per Minute

Deutsche Telekom's Fixed to Cellular Minutes and Revenues (US$)

	Call Minutes (Millions)	Revenue (Millions)	Revenue per Minute
1996	2,000	$986.18	$0.49
1997	2,972	$1,251.95	$0.42
1998	4,043	$1,466.10	$0.36

The above table summarizes Deutsche Telekom's volume of traffic made to all four German cellular networks, plus the revenues received from such calls. While total minutes have increased over the past three years, the revenue per minute has declined, reflecting the decrease in fixed to cellular prices.

4.10 Subscribers and Usage

Cellular Subscribers, Germany

	Subscribers - T-Mobil		Subscribers - Viag Interkom
	GSM 900	C-Netz	GSM 1800
1995	1,425,000	640,000	
1996	2,150,000	600,000	
1997	3,300,000	500,000	
1998	5,500,000	400,000	25,000
1999 1H	6,800,000	270,000	260,000

Incoming and Outgoing Usage

	Outgoing MOU/sub/month	Total MOU/sub/month
	T-Mobil	Viag Interkom
1996	97.0	
1997	95.0	
1998	80.0	94*

* For the first six months of 1999

Incoming and Outgoing ARPU (US$)

	Incoming ARPU	Outgoing ARPU	Total ARPU (includes rentals)	
	T-Mobil	T-Mobil	T-Mobil	Viag Interkom
1996		$66.77		
1997	$36.93	$59.47	$96.40	
1998	$29.84	$49.03	$78.87	$45.03

The information above indicates declining usage and ARPU per subscriber. The reason for decreased minutes of use is due to more low-usage subscribers, while the average revenue per subscriber decline is driven by the combination of lower cellular tariffs and higher proportion of low-usage subscribers.

4.11 Calling Party Pays and Roaming Issues

The principles of international roaming used by the German operators are quite similar to those used in the rest of Europe. The table below shows a sample of the roaming fees charged by T-Mobil.

Sample of Roaming Charges, T-Mobil (US$)

Country	Network Name	Network Type	Standard Incoming Rate	National Calls		Calls to Germany	
				Peak	Off-Peak	Peak	Off-Peak
Austria	Mobilkom	GSM 900	$1.08	$0.94	$0.40	$1.00	$1.00
Belgium	Proximus (Belgacom)	GSM 900	$1.08	$1.14	$0.44	$1.43	$1.07
Denmark	Mobilix	GSM 1800	n/a	$0.47	$0.47	$0.76	$0.76
Finland	Sonera (Tele Finland)	GSM 900	$1.08	$0.54	$0.54	$1.19	$1.09
France	France Telecom (Itineris)	GSM 900	$1.08	$0.99	$0.46	$1.42	$0.85
Russia	MTS	GSM 900	n/a	$1.68	$1.12	$5.51	$4.24
Hong Kong	Hong Kong Telecom	Dual GSM	n/a	$0.43	$0.38	$2.96	$2.63
UK	BT Cellnet	GSM 900	n/a	$0.54	$0.25	$1.56	$0.99
UK	Vodafone	GSM 900	n/a	$0.71	$0.29	$1.59	$1.02
USA	Omnipoint	GSM 1900	n/a	$1.16	$1.16	$2.28	$2.28

4.11.1 National Roaming

Having started its GSM 1800 network with only 50% population coverage, Viag Interkom was forced to seek roaming alliance with one of the German or foreign carriers. Until recently, Viag Interkom relied on Swisscom's roaming arrangements with other German carriers. This meant that in theory Viag provided nationwide service in Germany, but in practice, if a subscriber moved out of Viag's own cells the call would be dropped. The subscriber would then have to redial Swisscom's network and be charged at international roaming rates.

For instance, the cost of a generated roaming call in Germany included Swisscom's basic minute rate, a 25% roaming fee to the German GSM operators, a 15% Swisscom roaming fee and 16% value added tax. For calls that are terminated within Viag's network, there was a 15% administrative charge.

In March 1999, Viag Interkom negotiated a national roaming agreement with T-Mobil. Under this agreement Viag bought bulk airtime from the operator. With this arrangement, out of coverage calls will be seamlessly transferred to T-Mobil's network and charged at the normal Viag rates.

5. Mexican Case Study

5.1 Background Information

Country: **Mexico**

Operators:

Telcel www.telcel.com **Maria Carmen Salgado Lopez** **Investor Relations** **Av. Ejercito Nacional #373** **6th Floor** **Col. Grenada** **11520 México DF** **Phone: (525) 625-3875** csalgad@dipsa.telcel.com **Ramon Martinez Garcia** **Director, Engineering** **Phone: (525) 625-4046** **Fax: (525) 625-4006** rmartin@dipsa.telcel.com	**Iusacell** www.iusacell.com.mx **Juan Carlos Sotomayor** **Investor Relations** **Montes Urales 460, Piso 3** **Colonia Lomas de Chapultepec** **05348 México DF** **Phone: (525) 109 5759** jcarlos.sotomayor@iusacell.com.mx

Regulator:

Cofetel www.cofetel.gob.mx **Isabel Jarque Uribe** **Director, Statistics** **Bosques de Radiatas N° 44.** **Col. Bosques de las Lomas.** **05210 México D.F.** **Phone: (525) 261-4028** **Fax: (525) 261-4169** isabelja@cft.gob.mx

5.2 CPP Regulation

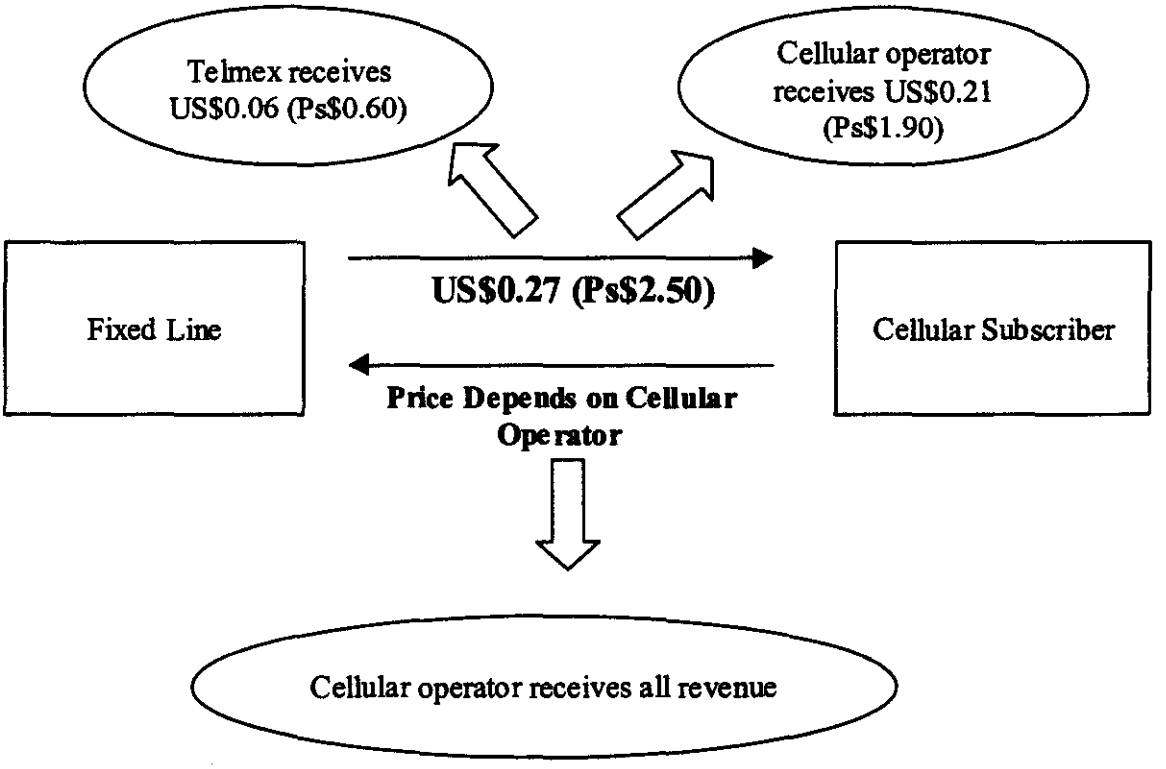
Calling party pays was implemented in Mexico on May 1, 1999. The Calling Party Pays system only applies to local calls made to cellular phones and calls between cellular phones; the Mobile Party Pays system continues to apply to incoming long distance calls and when a cellular subscriber roams outside of his/her home region. When a cellular subscriber roams outside of his/her home region the cellular subscriber pays for the entire cost of the call and the fixed line caller does not pay an additional fee above the price of the local call. All cellular operators in Mexico were required to implement Calling Party Pays and subscribers for both Telcel and Iusacell were switched automatically to the Calling Party Pays pricing scheme on May 1.

CPP is optional in Mexico and cellular users have the choice to switch back to a Mobile Party Pays scheme by calling the operator to change their phone number to one without the Calling Party Pays area code. When Cofetel approved Calling Party Pays legislation, the regulator decided to offer cellular subscribers a choice for subscribers that want to continue using Mobile Party Pays. Currently, about 90% of cellular subscribers are using the Calling Party Pays billing system in Mexico. Iusacell reports that only 0.5% of its subscribers are using the Mobile Party Pays system (5,000 subscribers out of about 1,000,000).

5.3 Billing Requirements and Issues

Interconnection agreements manage the billing between both fixed and cellular operators and between competing cellular operators. The Local Service Rules of 1997, approved by Cofetel, established the structure to allow Telmex and cellular operators to arrange interconnection agreements. This resulted in the interconnection agreement for Calling Party Pays (see diagram):

Calling Party Pays Revenue Distribution, Mexico



In addition to calls placed from a fixed phone to a cellular phone, Calling Party Pays also applies to calls placed between competing cellular operators. For calls within the same cellular network, the operator sets the airtime rate. For example, Telcel charges a flat rate of US$0.05 (Ps$0.50) per minute for calls within its own network. Iusacell, however, charges the same rate for calls within its network as calls that terminate outside of the operator's network; the price depends on the pricing plan the user chooses.

Telmex is responsible for billing the fixed line user each time a Calling Party Pays call is made to a cellular subscriber. On the 10th of every month, Telmex and the cellular operators exchange revenue collected over the past month. According to interconnection agreements arranged between the companies, Telmex is guaranteed a certain portion of each Calling Party Pays call. In addition, Telmex carries Telcel's long distance and local traffic and is responsible for obtaining the appropriate revenue from Telcel.

Before all cellular operators and Telmex approved the US$0.27 (Ps$2.50) Calling Party Pays rate, operators negotiated for over a year to concur on a rate that Telmex and the cellular operators thought was fair. All parties are not entirely satisfied with the tariff; cellular operators feel that Telmex receives an excessively high interconnection fee. Iusacell, for example, feels that the US$0.06 (Ps$.60) that Telmex receives is too high,

and as a result Calling Party Pays will not generate as large an increase in usage levels that could be possible at a lower rate. Cofetel will review the Calling Party Pays system after six months to consider adjusting the tariff.

Neither Telcel nor Iusacell required new infrastructure to facilitate Calling Party Pays. In order to incorporate both Calling Party Pays subscribers and Mobile Party Pays subscribers, Telcel and Iusacell divided their switch for subscribers using Calling Party Pays and for subscribers that choose to continue using Mobile Party Pays. If a cellular subscriber is using Calling Party Pays, a 044 area code applies to the phone number and is placed on one side of the switch; if the cellular subscriber is using Mobile Party Pays, the phone number is placed on the other side of the switch.

5.4 Difference Between Cost of Landline and Wireless Calls

5.4.1 Landline to Mobile

In Mexico, all tariffs are approved by Cofetel; mobile and fixed call revenue sharing is arranged by interconnection agreements between operators.

The Calling Party Pays rate is US$0.27 (PS$2.50) per minute, while the average local call costs US$0.13 (Ps$1.25) per minute. Every residential telephone package in Mexico includes 100 free local minutes per month. Calling Party Pays calls to cellular phones are not included in the 100 free minutes and fixed line callers are charged the appropriate rate for every call (see below). For Calling Party Pays rates that exceed US$0.27 (Ps$2.50), Telmex collects the additional revenue. For a cellular user that roams outside of his/her home region, the cellular user pays US$0.21 and the fixed line caller only pays the price for a local call.

Per Minute Pricing of Calling Party Pays (US$, plus tax)

Origination of Call	Price
Residential lines	
Under the 100 included minutes each month	$0.27
After 100 Minutes, 1st Minute	$0.42
After 100 Minutes, each additional minute	$0.27
Pay Phones	
1st Minute	$0.48
Each additional minute	$0.32

Telcel

Telcel charges a flat rate of US$0.05 for calls that terminate within its network. Calls between Telcel and other cellular operators cost the Calling Party Pays rate of US$0.27 (Ps$2.50).

Service Pricing, Telcel (US$, plus tax)

Type of Call	Price
Mobile-to-landline (average)	$0.47
Mobile-to-mobile (average, within Telcel's network)	$0.05
Mobile-to-mobile (average, outside of Telcel's network)	$0.27

Iusacell

Iusacell charges the same rate for calls within its network as calls that terminate outside of the operator's network; the price depends on the user's pricing plan. However, Iusacell offers a 50% discount on the airtime charges for incoming calls for its customers who are in their home region and have chosen to use Mobile Party Pays. Calls between Iusacell and other cellular operators cost the Calling Party Pays rate of US$0.27 (Ps$2.50).

5.5 Problems or Issues Reported by Carriers

5.5.1 Competitive

Negotiations for the interconnection agreement for Calling Party Pays began in early 1998 and were agreed upon in February 1999. Although cellular operators agreed on the Calling Party Pays rate of US$0.27 (Ps$2.50), some cellular operators such as Iusacell feel this tariff is too high. Prior to Calling Party Pays, Telmex charged cellular operators US$0.02 per minute for calls placed from a fixed line to a cellular phone. Since Calling Party Pays was implemented in May, Telmex increased this amount to US$0.06, claiming the US$0.04 difference covers administration and billing functions that the company must handle for Calling Party Pays. Telmex will consider reducing this fee if the cellular operators reduce their US$0.21 (Ps$1.90) portion of the Calling Party Pays charge, thereby reducing the overall Ps$2.50 Calling Party Pays fee.

5.5.2 Technical

Prior to implementing Calling Party Pays, Telcel had to reconfigure the operator's system in order to handle incoming calls. It went smoothly for the operator's contract

subscribers, however, the operator had to prevent incoming calls for its pre-paid subscribers for six months prior to the introduction of Calling Party Pays. Originally, the reconfiguration was going to take one month. However, in order to bill fixed line callers for calls made to pre-paid subscribers, Telcel had to alter the billing mechanism it originally implemented in 1996. The infrastructure caused difficulties which prevented incoming calls for longer than expected.

Iusacell experienced technical problems during the first few days after the new billing system was implemented. Some of Iusacell's outgoing calls were not completed due to one of Telmex's switches that did not recognize the area code 044. This problem has been fixed and no further technical problems have been reported.

5.5.3 Market/User Complaints

Since Calling Party Pays was implemented, there have been complaints by Telmex customers, upset about new charges that were accrued from calls placed to cellular phones. These Telmex customers were not accustomed to paying a fee for calls to cellular subscribers. Telcel received complaints from some of its cellular subscribers that wanted to change their pricing plan after Calling Party Pays was implemented. Many of Telcel's subscribers chose pricing plans which included a significant amount of bundled minutes. These subscribers wanted to receive a significant amount of calls, and therefore choose a plan with more included minutes than they would use for outgoing calls. When Calling Party Pays was passed in May, these subscribers found themselves with extra minutes each month that they would now have to use for outgoing calls or otherwise go unused. These subscribers requested to change their pricing plan to one that includes fewer bundled minutes but in many circumstances users were locked into a fixed contract, unable to change their pricing plan.

5.6 Notification or Awareness of Cost of Call

The area code 044 is assigned to mobile telephone numbers that use the Calling Party Pays system, indicating that the call will be charged a higher rate than a local call. No additional notification is given that the call will be charged a higher rate than a local call. However, if a call is made to a Calling Party Pays cellular number without the area code (044), a message directs the caller to redial using the (044) area code. Cofetel launched an ad campaign in late February to expand awareness of the new Calling Party Pays charge. According to Cofetel, the campaign increased awareness of the Calling Party Pays area code.

5.7 Subscribers and Usage

According to Cofetel, before the introduction of the Calling Party Pays system on May 1, calls from cellular phones to fixed lines accounted for 30% of traffic, which increased to 50% at the end of June (2 months after introducing Calling Party Pays). The total number of calls in Mexico rose 10% in May compared to April, and total minutes of use increased by 15%. The percent of incoming calls increased to 40% in May, up from 37% in April.

Total Cellular Subscribers and Average Minutes of Use, Mexico

	Users	Monthly Growth (%)	Average MOU per Month
4 Months Prior (January 1999)	3,516,100	4.74%	86.33
3 Months Prior (February 1999)	3,711,900	5.27%	88.52
2 Months Prior (March 1999)	3,984,500	6.84%	89.67
1 Month Prior (April 1999)	4,241,500	6.06%	82.53
Calling Party Pays Launched: May 1999			
1 Month Following (May 1999)	4,563,100	7.05%	91.16

5.7.1 Telcel

According to Ramon Martinez Garcia of Telcel, Calling Party Pays lowers the price of cellular service, making cellular a more affordable service and attracting segments of the population that previously might not have considered subscribing to cellular service. He adds, however, that the operator's pre-paid service has resulted in a large growth in subscribers (currently 74% of the total subscriber base) by targeting lower end users. Mr. Garcia expects an increase in average minutes of use and an increase of incoming minutes due to Calling Party Pays. Average monthly minutes of use has increased for pre-paid users, who now receive a large proportion of total usage from incoming minutes, offsetting a declining trend in outgoing minutes of use. For six months prior to implementing Calling Party Pays, Telcel's pre-paid users could not receive calls. This was due to a system that had to be reconfigured in order for pre-paid callers to receive calls yet have the fixed line caller billed for the call.

Calling Party Pays is expected to increase the company's ARPU due to an increase in average minutes of use. Over the last few years, Telcel experienced declining ARPU's due to a large increase of pre-paid subscribers, who tend to be low end users. However, Calling Party Pays increases ARPU due to the additional average revenue Telcel receives from increased incoming minutes of use.

Users and Growth

Subscribers, Telcel

	Users
5 Months Prior (December 1998)	2,113,462
4 Months Prior (January 1999)	2,219,903
3 Months Prior (February 1999)	2,352,099
2 Months Prior (March 1999)	2,531,143
1 Month Prior (April 1999)	2,731,397
Calling Party Pays Launched: May 1999	
1 Month Following (May 1999)	2,987,051
2 Months Following (End June 1999)	3,250,989

Usage and Revenue

Minutes of Use and ARPU, Telcel

	Pre-Paid Average MOU per Month			Contract Average MOU per Month	Overall ARPU
	Outgoing	Incoming*	Total	Total	
5 Months Prior (December 1998)	53.85	0	53.85	197.78	$46.42
4 Months Prior (January 1999)	48.51	0	48.51	191.41	$38.84
3 Months Prior (February 1999)	43.71	0	43.71	200.87	$37.88
2 Months Prior (March 1999)	29.92	0	41.81	199.70	$39.79
1 Month Prior (April 1999)	35.96	0	35.96	188.14	$36.28
Calling Party Pays Launched: May 1999					
1 Month Following (May 1999)	20.43	32.74	53.17	180.64	$37.98
2 Months Following (June 1999)	18.20	27.87	46.07	188.34	$36.60

***Note: No incoming calls were permitted to pre-paid subscribers**

5.7.2 Iusacell

Iusacell expects calling party pays to accelerate subscriber growth and increase usage throughout Mexico. According to Juan Carlos Sotomayor of Iusacell, Calling Party Pays increases average minutes of use more significantly for low end (primarily pre-paid) users that use their cellular phone principally to receive calls. He expects outgoing minutes for pre-paid subscribers to decrease in the future, which will be offset by incoming minutes. Total average monthly minutes of use has not decreased significantly in the last year due to digital expansion. Because of added value services and other features digital service offers, Iusacell subscribers are using their phones at steady rates, even with a large growth of pre-paid subscribers (currently 67% of total subscriber base).

In May and June (the two months following the introduction of Calling Party Pays), Iusacell experienced a 5% increase in the percentage of incoming calls. The company expects continued growth of incoming traffic volumes and foresees a 50/50 ratio of incoming compared to outgoing minutes in the future.

Mr. Sotomayor is concerned about the widespread use of older phones in Mexico. He feels the shorter battery life that these phones have will prevent users from leaving the handset on standby mode and as a result, diminish the potential for incoming calls.

In April 1999, in anticipation of calling party pays, Iusacell extended the validity of its *VIVA* pre-paid cards to a maximum of 365 days. After the balance of a pre-paid card is depleted, the customer has 185 days to activate a new card before being disconnected. During this 185 day period, the VIVA customer is able to receive incoming calls, but unable to make outgoing calls.

Users and Growth

Cellular Subscribers, Iusacell

	Users
End Year 1998	**755,375**
March 1999	**843,329**
Calling Party Pays Launched: May 1999	
June 1999	**951,000**
July 1, 1999	**1,000,000**

Usage and Revenue

Minutes of Use and ARPU, Iusacell

	Average MOU per Month			**ARPU**
	Outgoing	**Incoming**	**Total**	
End Year 1998	48	32	80	$35.96
March 1999	45	30	75	$34.15
Calling Party Pays Launched: May 1999				
July 1999	40	34	74	$35.22

6. United Kingdom Case Study

6.1 Background Information

Country: United Kingdom

Operators:

BT Cellnet www.btcellnet.co.uk Alan Tolfrey Corporate Customer Relations Phone: 44-113 388 6228 Alan.Tolfrey@btcellnet.co.uk Ann Granger Revenue Department Phone: 44-1753 565 335	**Vodafone** www.vodafone.co.uk Colin Farrell Contracts Executive Phone: 44-1635 50 3256

Regulator:

Office of Telecommunications (OFTEL) www.oftel.gov.uk Mike Galvin Regulatory Policy Directorate 50 Ludgate Hill London EC4M 7JJ, UK Phone: 44-171 634 88 69

GSM MOU Association:

GSM MOU Association www.gsm.org Pinar Cerman Tel: +353 1 2695922 Fax: +353 1 2695958 pcerman@gsm.org

6.2 European CPP Environment

Calling-Party-Pays (CPP) was introduced in Europe when the first analog cellular networks were launched in the early 1980s. An overwhelming majority of operators in Europe started using Calling Party Pays when launching service, although a small number of operators in Eastern Europe have chosen the Mobile-Party-Pays billing system.

In the CPP environment, the cost of a call placed to a cellular user is charged to the person that places the call. Cellular users pay only for outgoing calls. The exception to this case is international roaming, where cellular users are required to pay for incoming calls (roaming charge) while using a cellular network outside of their home country. This case is discussed in greater detail below.

Retail prices for calls to cellular users in the CPP environment are determined by the operator (fixed or mobile) in whose network the call originates. The operator (fixed or cellular) where the call originated bills its subscribers to recover the termination charges, the cost of conveying the calls to the cellular network, retail costs (marketing, billing, bad debt provision etc.) and a profit margin. The cellular operator that terminates a Calling Party Pays calls receives a payment (the termination charge) to compensate the operator for completing the call.

The Calling Party Pays price greatly depends on the interconnect charges that fixed and cellular operators agreed upon. Although there is no direct relationship between retail fixed-to-cellular prices and wholesale network charges, interconnection charges have been the underlying issue in the fixed-to-cellular price-making mechanism.

6.3 Interconnection Agreements

Interconnection refers to the physical and logical linking of telecommunications networks in order to allow the users of one network to communicate with users of other networks. To provide connection with fixed and cellular networks, cellular operators are required to enter into interconnect agreements. These interconnection agreements determine wholesale network termination charges, on the basis of which retail prices are established.

6.3.1 EU Regulation

The Interconnection Directive from the European Commission (EC), which was adopted in June 1997, requires member states to guarantee the rights of new telecom operators to obtain interconnection on equitable and non-discriminatory terms. The EC also recommends that operators with significant market power (determined by operators with a market share greater than 25%) implement a cost-accounting system based on forward-looking and long-run average incremental costs (LRAIC).

The EC is also considering the extension of the interconnection regime beyond the dominant national fixed operators, to those fixed and cellular operators that are defined to have significant market power by the national telecommunications regulator.

In February 1998, the EC has launched an investigation into interconnection tariffs that apply between fixed and cellular operators. The objectives of the investigation were to verify that:

- public switched telecommunications network (PSTN) operators apply the same conditions to cellular operators as to other fixed operators for calls that terminate within their network;
- cellular operators apply the same conditions to fixed and cellular operators for calls that terminate within their cellular network.

6.3.2 Issues

Cellular operators argue that the EU regulatory framework for fixed interconnection should not apply to cellular operators as well. The routing of cellular calls follows a path that is very different to calls that terminate on a fixed network. Fixed-line incumbent operator's cellular subsidiaries do not possess a level of market power with respect to the number of calls that are completed on their network.

6.4 Roaming Procedures

International roaming procedures are fairly similar across Europe. Operators establish bilateral roaming contracts and negotiate the level of wholesale network charges that the corresponding roaming party will pay to the host network. In May 1999, the GSM MoU Association developed a new Inter Operator Tariff (IOT) procedure, which stipulates that operators set fixed roaming rates with all their roaming partners. However, this procedure allows for operator-to-operator volume discounts or other bilateral arrangements.

Roaming capabilities are built into the GSM architecture, handling location and incoming call routing functions, as well as authentication and security aspects. When a subscriber roams in a foreign country, the user is registered on the foreign network, reporting the users location to the home network. For reliability reasons, GSM has a periodic location updating procedure. When an incoming call is made, the home network retrieves the user's location and routing information, and directs the call to the host network.

Mobile Party Pays applies to roaming charges in Europe; cellular users are required to pay for the roaming portion of incoming calls. Incoming charges arise due to the costs incurred by the cellular subscriber's operator transferring the call to the roaming host network. The largest portion of revenue earned from roaming is retained by the subscriber's home operator, however the roaming host network also adds administrative surcharges.

Roaming calls fall under the Mobile Party Pays billing system due to the fact that the calling party does not know the location of the party that is called. Therefore CPP would mean

incurring unforeseeable charges on the calls to cellulars. It is not likely that roaming calls will become CPP in the future, however operators are taking steps to make roaming charges more transparent to their users.

When a roaming user makes an outgoing call, the roaming host network handles the call similar to a call from its own network. The cost of such a call is usually higher due to additional administrative and billing costs of handling a roaming phone call. In addition, the subscriber's home network also includes its own mark-up in the price. Depending on the tax regulation between countries, taxes from the home country may also be added.

A typical breakdown of the charges for a roaming subscriber in Europe would look as follows:

- Incoming calls: roaming charge set by the home network
  administrative surcharge of the host network (10-20%)
  + tax (15-20%)

- Outgoing calls: charge set by the host network (depends on the type of call)
  + home network mark-up (20-25%)
  + tax (15-20%)

As the diversity of tariff plans is increasing, the operators are also designing special roaming packages targeted at business travelers and high volume users. In many cases, these packages offer 40-70% discounts on roaming fees or guarantee flat roaming rates for a number of foreign countries. Lower airtime costs are partly compensated by higher monthly charges.

Roaming is a significant revenue stream for European cellular carriers, as they typically receive 10% to 20% of revenue from roaming calls. For some operators, that number reaches 40% depending on the season of the year and on the country operating in.

Issues

Although retail roaming charges are published, there is little data about how much of these charges actually meet costs and how much constitute operator profit. So far, regulators and the European Commission have not interfered with roaming practices, but it is believed by many industry observers that roaming charges are extremely high. In future pressure could be placed on operators to reduce the price and make the tariffs more transparent.

6.5 Operator Background

6.5.1 Vodafone

Vodafone is the largest UK cellular operator with 5.8 million subscribers as of July 1999. The operator initially started with a TACS analogue network in January 1985 and was later awarded a GSM 900 license. The GSM network was launched in December 1991.

6.5.2 BT Cellnet

Cellnet started as a TACS network operator in January 1985, and begun its GSM 900 services in 1994. BT Cellnet has been 100% owned by British Telecom since April 1999, when BT bought a remaining 40% share of Cellnet from Securicor. BT Cellnet had 4.9 million customers as of July 1999.

Both Vodafone and BT Cellnet have always operated as Calling-Party-Pays (CPP). Operators are not required by OFTEL to operate a Calling Party Pays billing system, however, Mobile Party Pays was not considered in the UK as most operators in Europe have always been operating a Calling Party Pays system.

6.6 Notification or Awareness of Cost of Call

There is no formal notification for the calling party of the charge that will be levied when calling a cellular phone number. However, all cellular numbers start with the prefix 08 or 07; callers are generally able to distinguish cellular numbers from landline numbers. The four UK cellular operators have different codes assigned to their networks, although with widespread use of number portability in the future it will be more difficult for the caller to recognize what cellular network is behind the 4-digit code.

Pay phones or other types of telephones (such as hotel phones) are generally not blocked from executing calls to a cellular subscriber. No notification is used.

6.7 Billing Requirements and Issues

Retail prices for fixed-to-cellular and cellular-to-cellular calls are determined by the operators in where the calls originate. Over 75 per cent of all fixed-to-cellular calls (83 per cent of the volume measured) originate from BT's fixed line subscribers. BT, Cable & Wireless, as well as other CLECs comprise the reminder of landline calls; providing connection based on their interconnect agreements with cellular carriers. These interconnect agreements determine the interconnect charges that the landline operators pay to cellular operators.

For fixed-to-cellular calls, there is no difference between local and national charges, as the call is transferred to the nearest point of interconnect and then routed through the cellular system. Incoming international calls are usually routed through BT and Cable & Wireless fixed networks and terminated by cellular operators at the standard fixed to cellular rate.

Some of the existing competition for BT comes from operators routing fixed to cellular calls in the UK via other countries (tromboning) to exploit artificially low termination charges arising from historical international accounting arrangements. Cellular operators in the UK are trying to

limit the number of fixed operators they interconnect with and in the future would like to have one standard termination charge for all operators.

The procedure of establishing cellular to cellular interconnection rates is similar to that for fixed to cellular and cellular to fixed calls, as it requires interconnection agreements with each cellular operator. The cellular operator in whose network the call originated makes termination payments to the cellular network where the call is completed. Cellular to cellular prices reflects termination charges, cost of conveying the call, retail costs and a profit margin.

UK operators, however, route the largest share of cellular to cellular calls through fixed networks. Vodafone, for example, has chosen to use BT as a transit mechanism for calls from other cellular networks. In this case, interconnection rates are higher than the normal fixed to cellular interconnection rate, as it includes this transit fee.

The regulator OFTEL did not interfere with fixed to cellular interconnection agreements up until 1996, when it launched an inquiry into the price of calls placed from British Telecom's fixed network to Vodafone and Cellnet cellular users. In October 1997, OFTEL published Guidelines on Operation of the Network Charge Controls, which established a price cap on BT's charges for call termination fees (including cellular-to-fixed) at RPI-8%. The Guidelines, however, do not impose restrictions on fixed to cellular interconnection charges, as the UK's cellular market is considered to be fully competitive.

In the course of 1998, however, OFTEL conducted an inquiry into the price of calls to Vodafone and Cellnet cellular subscribers. The case was then passed to the Monopolies and Mergers Commission (MMC). The MMC has investigated both the interconnection rates imposed by Cellnet and Vodafone, as well as BT's retainment rates. Cellular operators were forced to lower their termination rates to an average of US$0.19 (11.7p). Vodafone, for example, lowered its termination charges to US$0.22 (13.8p) peak, US$0.16 (9.8p) off-peak, and US$0.08 (4.71p) weekend.

6.8 Difference Between Cost of Landline and Wireless Calls

Below is the summary of prices applied to the different types of calls.

Service Pricing, BT Cellnet (US$, tax included)

	Peak	Off-Peak	Weekends
Landline(BT)-to-mobile (from 4.30.99)	$0.32	$0.31	$0.03
Landline(BT)-to-mobile (previous rates)	$0.48	$0.32	$0.16
Mobile-to-landline	.48 - .64	.03-.16	$0.03
Mobile-to-mobile (within BT Cellnet network)	$0.16	$0.16	$0.16
Mobile-to-mobile (outside BT Cellnet network)	$0.81	$0.48	$0.48
Landline-to-landline (BT local)	$0.06	$0.02	$0.02
Landline-to-landline (BT national)	$0.13	$0.05	$0.05

Note: Peak: 8 AM-7PM, Off-Peak: 7:01 PM to 7:59 AM Monday to Friday

Service Pricing, Vodafone (US$, tax included)

	Peak	Off-Peak	Weekends
Landline(BT)-to-mobile	$0.48	$0.32	$0.16
Mobile-to-landline	$0.48 - $0.56	$0.08	$0.08
Mobile-to-mobile (within Vodafone network)	$0.08	$0.08	$0.08
Mobile-to-mobile (outside Vodafone network)	$0.81	$0.56	$0.56
Landline-to-landline (BT local)	$0.06	$0.02	$0.02
Landline-to-landline (BT national)	$0.13	$0.05	$0.05

Note: Peak: 8 AM-7PM, Off-Peak: 7:01 PM to 7:59 AM Monday to Friday

Landline to cellular calls are priced 5-10 times higher than the price of regular local calls. High landline to cellular prices are mostly caused by the level of interconnection rates. However, the cost of calls to UK cellular subscribers does not depend on the distance; therefore it is more sensible to compare the price of calls to cellular subscribers with long distance landline prices: US$0.13 (8p) peak, US$0.05 (3p) off-peak.

Calls between cellular networks remains the most expensive type of calls, due to high interconnection tariffs. By imposing high cellular to cellular prices, cellular operators try to

encourage usage on their own networks and discourage traffic flows to competitive cellular operators.

Cellular prices are subject to OFTEL price controls. OFTEL imposes floors and ceilings to prevent predatory and exploitative pricing in the United Kingdom.

Revenue per Minute, Vodafone and BT Cellnet (US$)

	Incoming revenue/min		Outgoing revenue/min	
	Vodafone	BT Cellnet	Vodafone	BT Cellnet
1996	$0.29	$0.31	$0.47	$0.50
1997	$0.26	$0.29	$0.43	$0.42
1998	$0.23	$0.24	$0.31	$0.33

The above table shows average revenue that Vodafone and BT Cellnet earn per minute of incoming and outgoing calls. Incoming revenue per minute demonstrates average revenue from fixed to cellular and cellular to cellular interconnection charges.

Incoming and outgoing revenues per minute for Vodafone and BT Cellnet reflect the existing price structure. Revenues per minute have been falling over the past few years to reflect the declines in prices and interconnect rates.

Incoming revenues represent interconnect revenues and include both calls from landline and from other cellular networks. From 1996-1998, the gap between incoming and outgoing revenue has narrowed; in 1996 outgoing revenue per minute was 60% higher than incoming minutes, however in 1998 outgoing revenue per minutes was only 35%. As competition forces cellular operators to reduce the prices of outgoing airtime, incoming revenue per minute remains relatively high compared to outgoing revenue.

6.9 Subscribers and Usage

Total Subscribers, Vodafone and BT Cellnet

	Subscirbers - Vodafone		Subscirbers - BT Cellnet	
	GSM 900	TACS	GSM 900	TACS
1995	400,000	1,933,000	256,000	2,044,000
1996	1,220,000	1,580,000	883,000	1,797,000
1997	2,305,000	835,000	2,060,000	930,000
1998	3,964,000	950,000	3,631,000	413,000
1999 1H	4,990,000	790,000	4,680,000	299,000

Incoming and Outgoing Usage, Vodafone and BT Cellnet

	Incoming MOU/sub/month		Outgoing MOU/sub/month		Total MOU/sub/month	
	Vodafone	BT Cellnet	Vodafone	BT Cellnet	Vodafone	BT Cellnet
1996	40.7	31.0	68.8	54.2	109.5	85.2
1997	47.4	38.1	79.8	61.5	127.3	99.6
1998	49.7	43.2	86.3	66.9	136.0	110.0

Incoming and Outgoing ARPU, Vodafone and BT Cellnet (US$)

	Incoming ARPU/month		Outgoing ARPU/month		Total ARPU/month (includes rentals)	
	Vodafone	BT Cellnet	Vodafone	BT Cellnet	Vodafone	BT Cellnet
1996	$11.89	$9.53	$32.56	$27.07	$59.27	$48.80
1997	$12.36	$11.05	$34.30	$25.98	$62.22	$49.38
1998	$11.63	$10.45	$26.65	$22.04	$51.05	$43.32

Both operators have shown increases in incoming and outgoing minutes of use over the past three years. Lower cellular prices and increased popularity of cellular telephony in the UK favor higher minutes of use. Higher usage, however, does not compensate for falling prices, as average revenues per user have declined. While decrease in outgoing revenues per user reached about 22%, incoming revenues per user are more stable, at the level of US$11.60- US$11.94 (£7.2-£7.4) for Vodafone, and US$9.52 - US$10.49 (£5.9-£6.5) for BT Cellnet. Total ARPU is the sum of incoming and outgoing ARPU plus revenues from monthly rental fees.
The above data show that incoming minutes and revenues are less price sensitive compared to outgoing minutes and revenues.

6.10 Calling Party Pays and Roaming Issues

Vodafone's and Cellnet's digital and analogue networks have attained extensive geographical coverage (98%), and therefore national roaming is not required.

BT Cellnet has recently offered a one-rate roaming plan with 14 European countries. In this case subscribers will be charged one flat roaming fee US$0.56 (35p) while traveling to the 14 selected countries. The introduction of this plan did not require any special agreements with partner operators for lower charges. BT Cellnet estimated the viability of this tariff plan by analyzing historical roaming usage trends of its customers.

Vodafone has roaming agreements in 91 countries, with 174 operators. Roaming revenues, both from customers abroad and visitors to the UK network, represent 23.4% of the company's contract digital outgoing airtime and access revenues. Roaming usage and revenues increase

over time, as more GSM networks are being launched all over the world and as more roaming agreements are made.

Sample of Roaming Charges, BT Cellnet (US$, plus tax)

Country	Network Name	Network Type	Standard Incoming Rate	National Calls	International Calls					
					France	Germany	Hong Kong	Russia	UK	USA
Austria	Mobilkom	GSM 900	$1.29	$0.85	$0.90	$0.90	$0.99	$0.90	$0.90	$0.99
Belgium	Proximus (Belgacom)	GSM 900	$1.29	$1.01	$1.27	$1.27	$2.29	$2.02	$1.27	$1.47
Denmark	Mobilix	GSM 1800	$1.29	$0.42	$0.80	$0.67	$2.13	$0.98	$0.71	$0.98
Finland	Sonera (Tele Finland)	GSM 900	$1.29	$0.56	$1.30	$1.21	$2.60	$1.30	$1.30	$1.53
France	France Telecom (Itineris)	GSM 900	$1.29	$0.88	n/a	$1.26	$1.90	$1.55	$1.26	$1.29
Germany	T-Mobil (D1)	GSM 900	$1.29	$1.27	$1.27	n/a	$2.25	$1.27	$1.27	$1.27
Germany	Viag Interkom	GSM 1800	$1.29	$1.23	$1.23	n/a	$2.20	$1.23	$1.23	$1.23
Russia	KB Impuls	GSM 1800	$2.28	$0.74	$3.67	$3.67	$6.42	$0.00	$3.67	$6.42
Hong Kong	Hutchison	GSM 900	$1.77	$0.41	$2.52	$2.74	$0.00	$3.62	$1.56	$1.02
USA	Omnipoint	GSM 1900	$1.77	$1.25	$2.46	$2.46	$2.46	$2.46	$2.46	n/a
USA	Powertel	GSM 1900	$1.77	$0.90	$0.91	$0.91	$1.25	$3.12	$0.91	n/a

Sample of Roaming Charges, Vodafone (US$, plus tax)

Country	Network Name	Network Type	Standard Incoming Rate	National Calls	International Calls				
					France	Germany	Asia	UK	USA
Austria	Mobilkom	GSM 900	$1.19	$0.85	$0.90	$0.90	$2.19	$0.90	$0.98
Belgium	Proximus (Belgacom)	GSM 900	$1.07	$1.16	$1.40	$1.40	$3.99	$1.40	$1.65
Denmark	Mobilix	GSM 1800	$1.07	$0.42	$0.66	$0.67	$3.91	$0.71	$0.97
Finland	Sonera (Tele Finland)	GSM 900	$1.19	$0.48	$1.13	$1.13	$2.65	$1.13	$1.13
France	France Telecom (Itineris)	GSM 900	$1.07	$0.87	n/a	$1.26	$2.65	$1.26	$1.29
Germany	T-Mobil (D1)	GSM 900	$1.07	$1.26	$1.26	n/a	$2.36	$1.26	$1.34
Germany	Viag Interkom	GSM 1800	$1.07	$1.23	$1.23	n/a	$2.20	$1.23	$1.23
Russia	KB Impuls	GSM 1800	$2.50	$0.73	$3.63	$3.63	$6.33	$3.63	$6.33
Hong Kong	Hutchison	GSM 900	$2.37	$0.40	$2.08	$2.08	$2.31	$1.13	$0.61
USA	Omnipoint	GSM 1900	$1.92	$1.03	$2.61	$2.61	$4.78	$2.61	n/a